BAB V
KESIMPULAN DAN SARAN

V.1. Kesimpulan

Dari penelitian tentang adsorben dari selulosa kulit durian yang termodifikasi jaringan logam fenolik, dapat disimpulkan bahwa:

1. Sintesis selulosa dari kulit durian berhasil dilakukan, yang ditandai dengan %selulosa yang didapatkan dari uji chesson yaitu sebesar 79,92% dan didukung dari hasil karakterisasi FTIR, XRD, SEM, dan EDX yang menunjukan karakteristik selulosa;
2. Sintesis selulosa termodifikasi MPN berhasil dilakukan, yang ditandai dari hasil karakterisasi FTIR dan EDX yang menunjukan adanya gugus Fe-O dan atom Fe pada sampel DRC-FGN dan DRC-FTN;
3. pH optimum untuk adsorpsi Cr(VI) pada sampel DRC, DRC-FGN, dan DRC-FTN adalah pada pH 2 dengan %removal sebesar 30,4%, 79,41%, dan 99,17%. Hal tersebut juga menunjukan bahwa modifikasi MPN terbukti dapat meningkatkan kapasitas adsorpsi;
4. Variasi mol terbaik pada DRC-FGN adalah 1:1 dan DRC-FTN adalah 1:3 yaitu sebesar 88,24% dan 99,02%. Hal tersebut menunjukan modifikasi MPN dengan TA dapat meningkatkan kapasitas adsorpsi lebih besar dibandingkan GA;
5. Dosis adsorben, waktu kontak, dan suhu berbanding lurus dengan %*removal* adsorben;
6. Konsentrasi awal adsorbat berbanding terbalik dengan *%removal* adsorben;
7. Berdasarkan isoterm adsorpsi didapatkan bahwa adsorpsi sampel DRC, DRC-$FGN_{1:1}$ dan DRC-$FTN_{1:3}$ terjadi secara fisisorpsi dan homogen serta mengikuti model Sips;

8. Berdasarkan kinetika adsorpsi didapatkan bahwa adsorpsi sampel DRC, DRC-$FGN_{1:1}$ dan DRC-$FTN_{1:3}$ mengikuti model *pseudo-first order*;
9. Berdasarkan kinetika adsorpsi IPD didapatkan bahwa adsorpsi sampel DRC dan DRC-$FGN_{1:1}$ secara dominan dipengaruhi oleh difusi intrapartikel, sedangkan DRC-$FTN_{1:3}$ dipengaruhi oleh difusi intrapartikel dan difusi film secara simultan;
10. Berdasarkan termodinamika adsorpsi didapatkan bahwa adsorpsi sampel DRC, DRC-$FGN_{1:1}$ dan DRC-$FTN_{1:3}$ terjadi secara spontan, endotermis dan bersifat fisisorpsi;
11. Recylabilitas sampel DRC, DRC-$FGN_{1:1}$ dan DRC-$FTN_{1:3}$ mampu mempertahankan efisiensi penyerapan 21%; 40%; dan 28% dalam lima siklus adsorpsi.

V.2. Saran

Pada penelitian ini, adsorben yang dihasilkan berbentuk serabut dan memiliki ukuran partikel relatif kecil. Hal ini dapat menyebabkan partikel kecil tersebut mudah lepas ke larutan (mudah terurai saat proses uji recyclabilitas). Kami menyarankan peneliti yang tertarik untuk memodifikasi DRC dalam bentuk lain seperti hidrogel sebagai binder yang juga dimodifikasi menggunakan MPN, serta mempelajari potensi dari lignoselulosa kulit durian dan lignoselulosa termodifikasi MPN untuk menyerapan limbah. Selain itu, dapat mempelajari lebih lanjut pengaruh dari jumlah coating, waktu coating MPN dan melakukan uji kuantitatif (kadar Fe pada residu coating MPN) serta melakukan uji aktivitas antibakteri dari adsorben yang mana merupakan sifat dasar dari MPN.

Pada penelitian ini, berdasarkan model isoterm, kinetika, dan termodinamika adsorpsi mengindikasikan proses adsorpsi secara fisisorpsi,

sedangkan berdasarkan analisa BET memiliki karakteristik makropori atau non-pori yang mana mengindikasikan prses adsorpsi terjadi secara kemisorpsi. Maka dari itu, perlu dilakukan analisa karakterisasi FTIR setelah proses adsorpsi Cr(VI) untuk melihat apakah terdapat perubahan gugus fungsional pada adsorben.

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